

DOPED ELONGATED SEMICONDUCTORS, GROWING SUCH SEMICONDUCTORS, DEVICES INCLUDING SUCH SEMICONDUCTORS AND FABRICATING SUCH DEVICES**Publication number:** JP2004507104T**Publication date:** 2004-03-04**Inventor:****Applicant:****Classification:****- international:** C30B11/00; C30B25/00; G01N27/12; G01N27/414; G01N33/543; G11C13/02; H01L23/532; H01L29/06; H01L29/207; H01L29/267; H01L51/30; H01L33/00; C30B11/00; C30B25/00; G01N27/12; G01N27/403; G01N33/543; G11C13/02; H01L23/52; H01L29/02; H01L51/05; H01L33/00; (IPC1-7): H01L29/06; H01L21/329; H01L21/331; H01L27/10; H01L29/73; H01L29/88; H01L33/00**- european:** H01L29/06C6; C30B11/00; C30B25/00F; G01N27/12; G01N27/414; G01N33/543; G11C13/02; G11C13/02N; H01L23/532M3; H01L29/207; H01L29/267; H01L51/00M4D; Y01N4/00; Y01N8/00**Application number:** JP20020521336T 20010822**Priority number(s):** US20000226835P 20000822; US20000254745P 20001211; US20010292121P 20010518; US20010292035P 20010518; US20010292045P 20010518; US20010291896P 20010518; WO2001US26298 20010822**Also published as:**

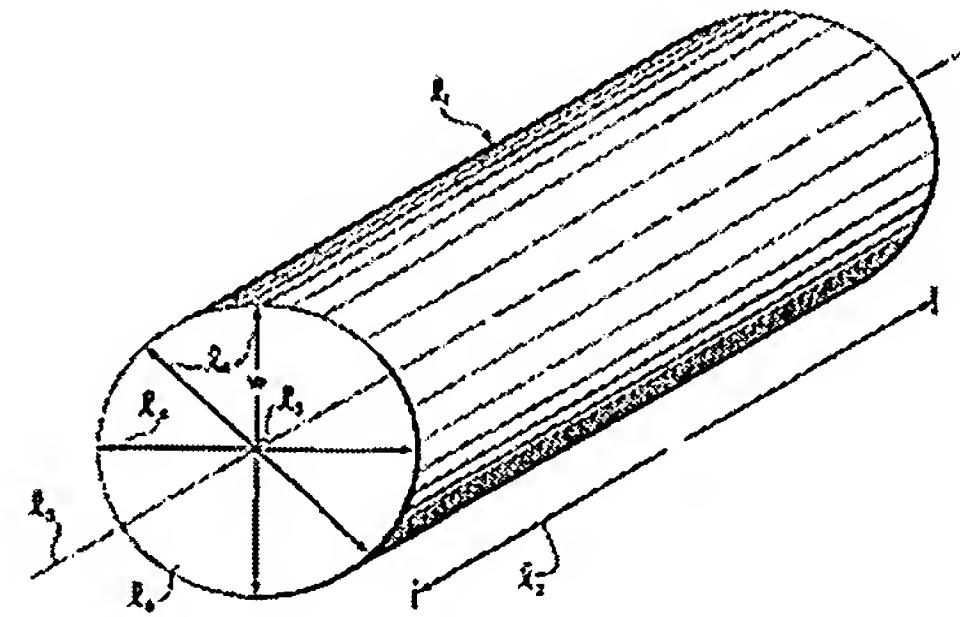
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A bulk-doped semiconductor that is at least one of the following: a single crystal, an elongated and bulk-doped semiconductor that, at any point along its longitudinal axis, has a largest cross-sectional dimension less than 500 nanometers, and a free-standing and bulk-doped semiconductor with at least one portion having a smallest width of less than 500 nanometers. Such a semiconductor may comprise an interior core comprising a first semiconductor; and an exterior shell comprising a different material than the first semiconductor. Such a semiconductor may be elongated and may have, at any point along a longitudinal section of such a semiconductor, a ratio of the length of the section to a longest width which is greater than 4:1, or greater than 10:1, or greater than 100:1, or even greater than 1000:1. At least one portion of such a semiconductor may a smallest width of less than 200 nanometers, or less than 150 nanometers, or less than 100 nanometers, or less than 80 nanometers, or less than 70 nanometers, or less than 60 nanometers, or less than 40 nanometers, or less than 20 nanometers, or less than 10 nanometers, or even less than 5 nanometers. Such a semiconductor may be a single crystal and may be free-standing. Such a semiconductor may be either lightly n-doped, heavily n-doped, lightly p-doped or heavily p-doped. Such a semiconductor may be doped during growth. Such a semiconductor may be part of a device, which may include any of a variety of devices and combinations thereof, and a variety of assembling techniques may be used to fabricate devices from such a semiconductor. Two or more of such a semiconductors, including an array of such semiconductors, may be combined to form devices, for example, to form a crossed p-n junction of a device. Such devices at certain sizes may exhibit quantum confinement and other quantum phenomena, and the wavelength of light emitted from one or more of such semiconductors may be controlled by selecting a width of such semiconductors. Such semiconductors and device made therefrom may be used for a variety of applications.

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